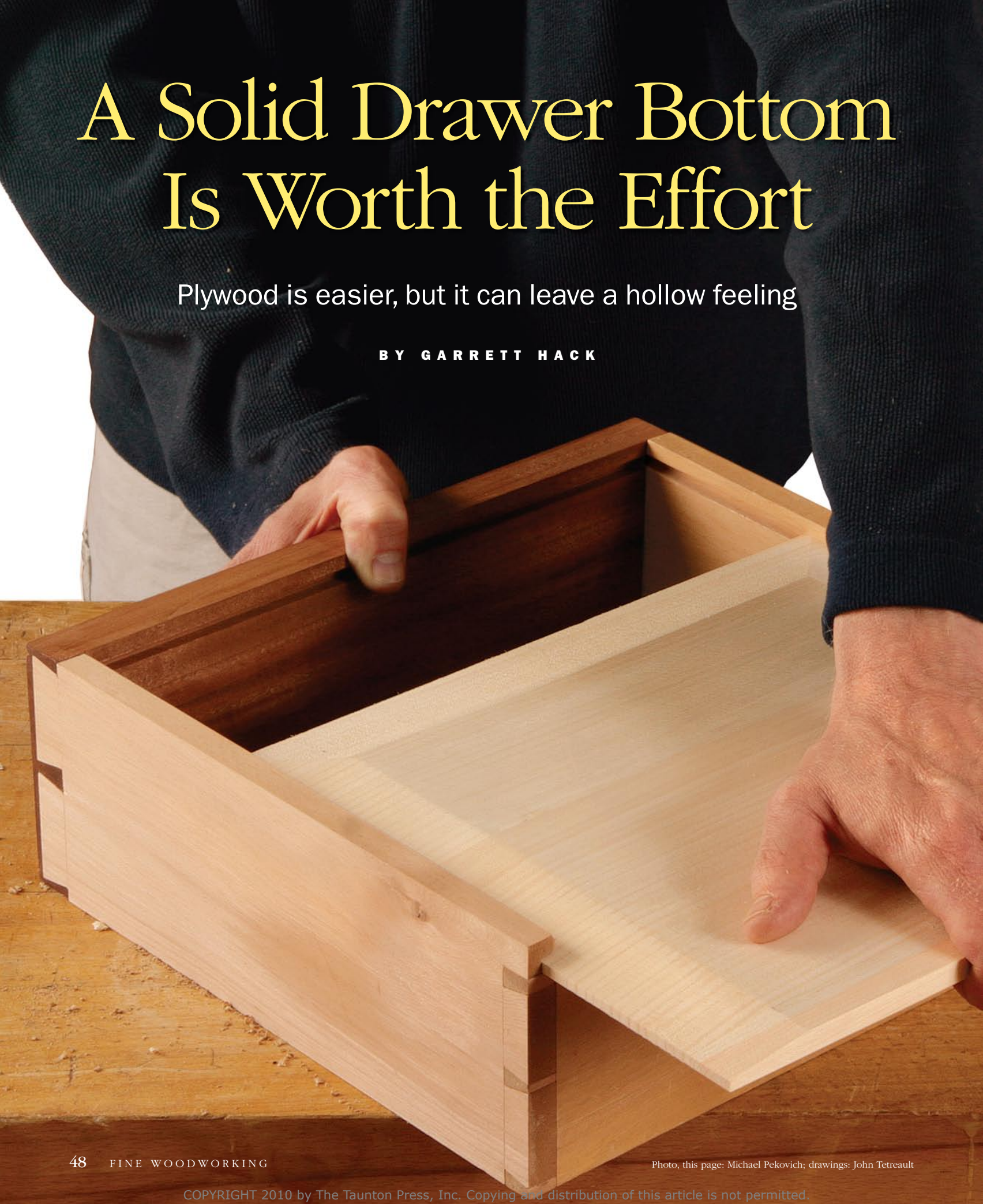
A Solid Drawer Bottom Is Worth the Effort

Plywood is easier, but it can leave a hollow feeling

BY GARRETT HACK



Photo, this page: Michael Pekovich; drawings: John Tetreault

Plywood is popular for drawer bottoms because it's easy, but I think a solid bottom is better and more appealing. Solid wood is plenty strong, and it's definitely more attractive. Solid wood is also easy to customize: You can use thicker, stiffer stock for heavy drawers, or very thin, light stock for the smallest ones. You can use a wide variety of woods, and some, like cedar, have the bonus of a wonderful aroma. Last but not least, a smoothly planed solid-wood bottom attracts far less dirt than sanded plywood.

I must admit, I've repaired many solid-wood drawer bottoms that were split and falling out. Were the drawers overloaded, were the bottoms too thin, or was seasonal movement not considered? It's tough to say, but building a solid-wood drawer bottom that can last through the ages is no more difficult than fitting a panel to a frame. In this article, I'll explain how I make and fit a basic drawer bottom and show a few variations for large and small drawers.

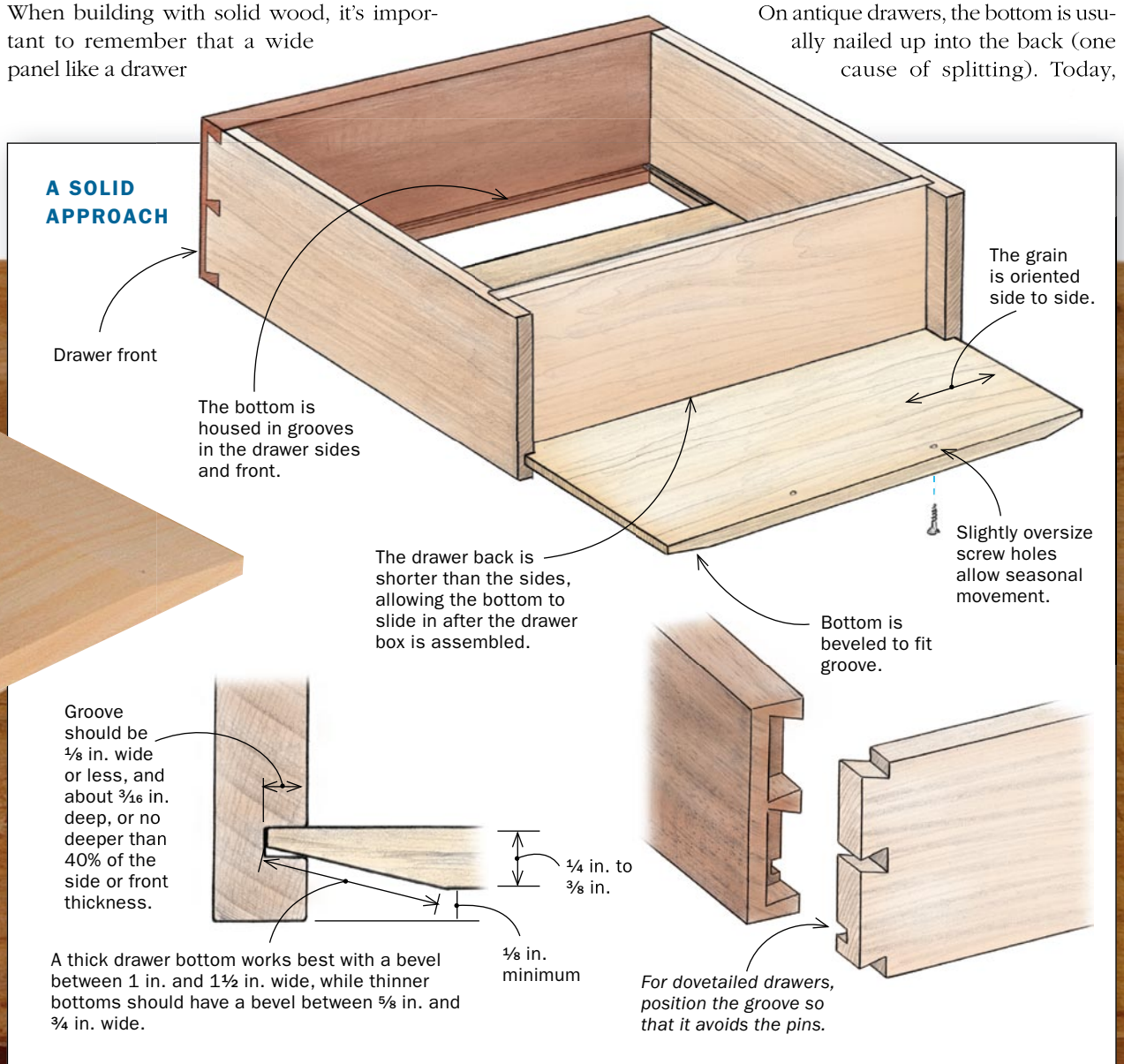
Anticipate wood movement

When building with solid wood, it's important to remember that a wide panel like a drawer bottom will expand and contract seasonally—as much as ⅛ in. with a large drawer. I deal with this movement in several ways. First off, I don't use glue, and I bevel the edges so the bottom can float in the grooves that house it. I also run the grain from side to side. Running the grain this way ensures that movement takes place from front to back, so the bottom doesn't shrink and fall out of the grooves. By making the groove in the drawer front deeper (40% of total thickness) than in the sides, additional movement is accommodated there. Last, I use quartersawn stock, which is more stable than flatsawn material.

There are a few other important tricks: The drawer back is shorter than the sides, stopping at the top of the grooves. This allows me to slide in the bottom after the drawer box is assembled. That gives me one less part to deal with during glue-up, and makes the bottom repairable. It also gives me another chance to fine-tune the bottom or better match a curved front.

On antique drawers, the bottom is usually nailed up into the back (one cause of splitting). Today,

A SOLID APPROACH



Solid bottoms, step by step

1. PREPARE THE BLANK

Hack resaws his drawer bottoms out of 8/4 stock for the best yield. He prefers quartersawn because its vertical grain means less seasonal movement. After gluing up the panel, a few passes with a fine-tuned handplane over the top and bottom produce a glassy-smooth surface that attracts less dirt than sanded surfaces.

2. BEVEL THE EDGES

Use a pencil and a combination square to lay out the bottom's three-sided bevel. When he's making only one or two drawers, Hack uses handplanes to make the bevel, starting with a block plane and finishing with a smoother (in production mode, he uses the tablesaw). A test block with a groove matched to the drawer groove is a fast and accurate way to check the bevel thickness. Making a final check with a second block is a good idea, as the groove in the first will widen with use.

Photos, except where noted: Patrick McCombe

I often see screws set in slots. The theory is that the slot allows for front-to-back movement, but I don't believe it works this way. Any weight in the drawer causes the screw head to dig in, preventing slippage.

My method is to place two screws (or three for especially wide drawers) in slightly oversize holes without slots. This allows the back to flex outward if the bottom expands, which might happen with large drawers. The deeper groove in the drawer front allows for shrinkage and expansion. Making sure your wood is suitably dry minimizes shrinkage problems.

The drawer groove matters, too

The details of the side groove—its location, width, and depth—are very important engineering aspects of building a good drawer. Together with the screws into the back, it supports much of the weight in the drawer. The deeper and larger the groove, the more you weaken the side; the lower down it is, the less support it gives the bottom (this wood breaking away is another typical drawer repair). Beveling the bottom is an elegant solution, which puts the groove high yet the bottom as low in the drawer as is practical. I use a fine bevel in a narrow groove; it's very strong.

Like the front, the depth of the side grooves should be about 40% of the side thickness. I cut the groove in a single pass on the tablesaw with a standard-kerf blade, or a thin-kerf blade for smaller drawers. I sometimes use a dado blade for large drawers. I think about the position of the groove when laying out the dovetails, so as not to cut through a pin later, which would make the groove visible on the outside of the drawer. I also want at least ⅛ in. of clearance under the drawer bottom, so it won't ever drag against the case. For large drawers where flexing of the bottom is a concern, I put the groove slightly higher.

Soft woods work best

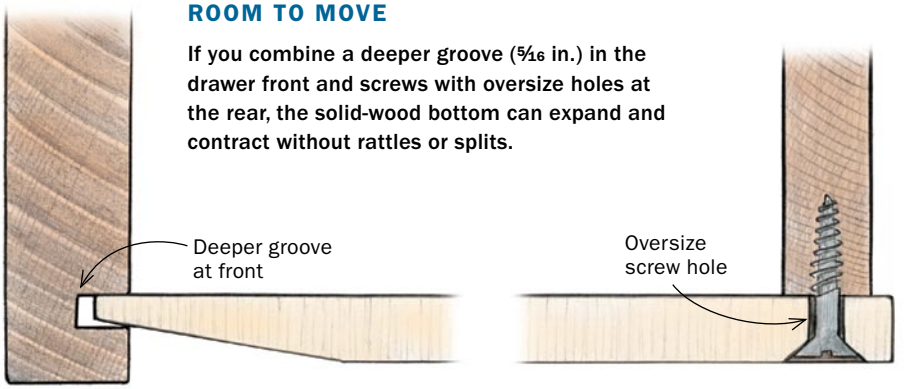
My favorite woods for bottoms are softwoods or softer hardwoods, because they are easy to work, stable, lightweight but strong, and generally have low shrinkage. White pine, white or red cedar, basswood, aspen, and poplar are all good choices. But hardwoods such as oak, cherry, or maple are fine, too. While breaking a drawer bottom

3. ALLOW FOR MOVEMENT

Dividing the space into thirds, Hack uses a pair of screws to secure the drawer bottom to the back of the box. The holes in the drawer bottom are slightly oversize to allow for some seasonal movement. A deep groove in the drawer front accommodates the rest (see below).

ROOM TO MOVE

If you combine a deeper groove (5⁄16 in.) in the drawer front and screws with oversize holes at the rear, the solid-wood bottom can expand and contract without rattles or splits.



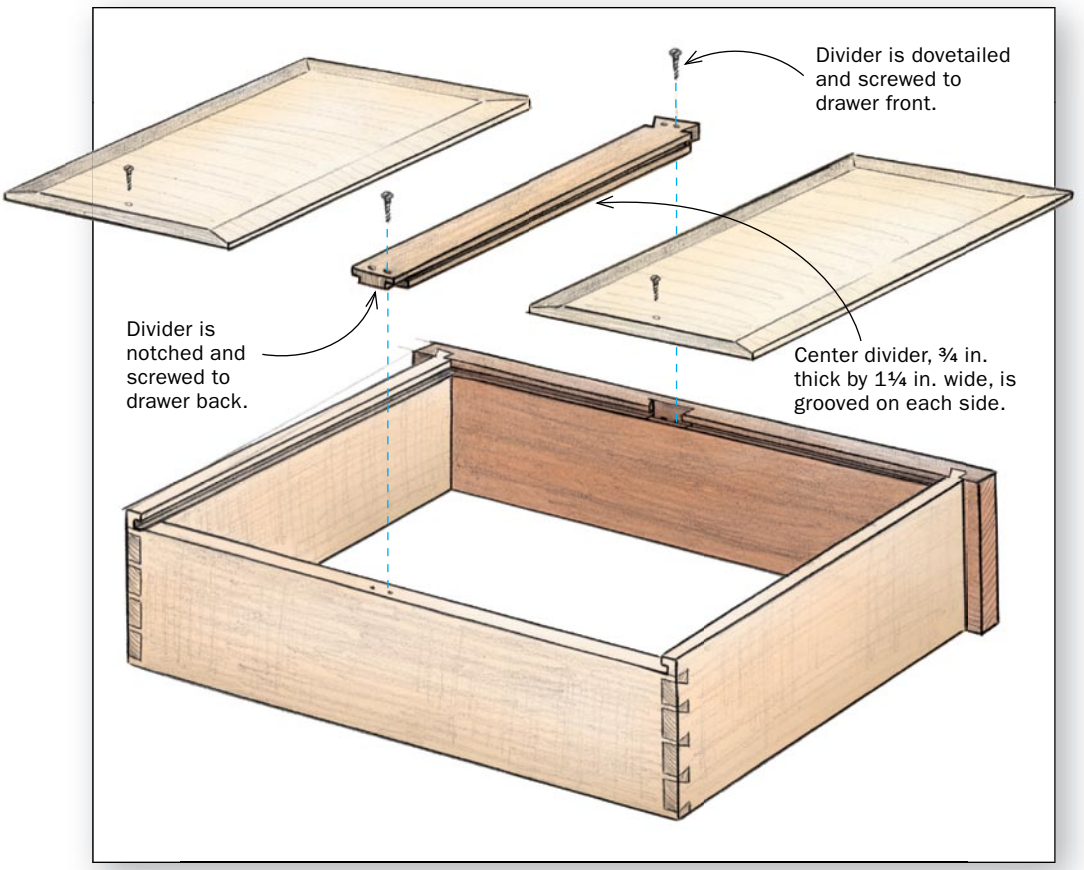
is unlikely, a heavy load could flex it enough so it drags on the runners below it. But because woods vary, I have no rule of thumb for how thick to make a bottom. A large dresser drawer might have one ⅜ in. thick; a small drawer needs a bottom ¼ in. thick, maybe less. One advantage of a solid bottom is you can make it any thickness. So when I am planing materials for bottoms, I'll flex the wood as I go to sense how stiff it is. When glued together in a panel and supported by the grooves all the way around, the bottom will be stiffer still.

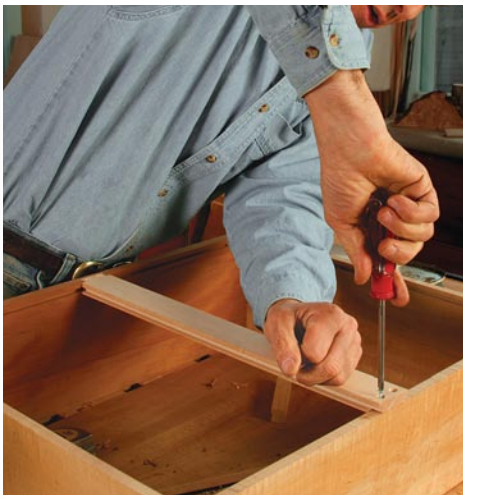
Making and fitting bottoms

For me, making drawer bottoms begins on the bandsaw; it is an unforgivable waste of time and wood to plane down a ¾-in.-thick board. I find that 8/4 stock is the most efficient choice, typically yielding four or six pieces. Quartersawn stock is never very

Wide drawers need a center divider

Drawers wider than about 28 in. should have a center divider to prevent sagging. The front of the divider is attached with a dovetail and a pair of screws; the rear of the divider is simply notched over the back and secured with screws.





Dovetail the front, notch the back. *Hack dovetails the center divider into the front (top). After confirming that the drawer box is square, Hack centers the divider on the drawer back, then glues and screws it in place (bottom).*

wide, so I glue up my bottoms from pieces. As I send them through the planer, some clean up faster than others, so I put the thicker ones into one pile, the slightly thinner ones in another, and so forth. I often use the various thicknesses as graduated bottoms for graduated drawers.

Once glued into panels and cut to size (to length but slightly wide for now), I handplane the top surface smooth. This becomes my reference surface for beveling the bottom edges. I plane each bevel to a snug fit in a groove run on a scrap piece earlier. The bevel should almost bottom out in the groove, just as the bottom will fit into the actual drawer.

The last steps are to plane the underside and cut it to width. I leave the bottom a bit long at the back so that the screws into the back have plenty of wood around them. If I need to get the bottom out once it is in place (to tweak the squareness of the drawer), I drop the drawer, back down, on the edge of my bench. Last, I screw the back edge to the back, well in from the sides.

Wide drawers—The Gamble House in Pasadena, Calif., has a pantry drawer over 5 ft. wide. A single bottom won't work in a drawer this wide—it will flex too much and eventually fail. Better to divide the bottom into panels partially supported by a divider from front to back. It's essentially a modified frame-and-panel design. The front of this divider is dovetailed into the front, and the back is screwed to the back. It's even more efficient if the divider also becomes a center guide for the drawer.

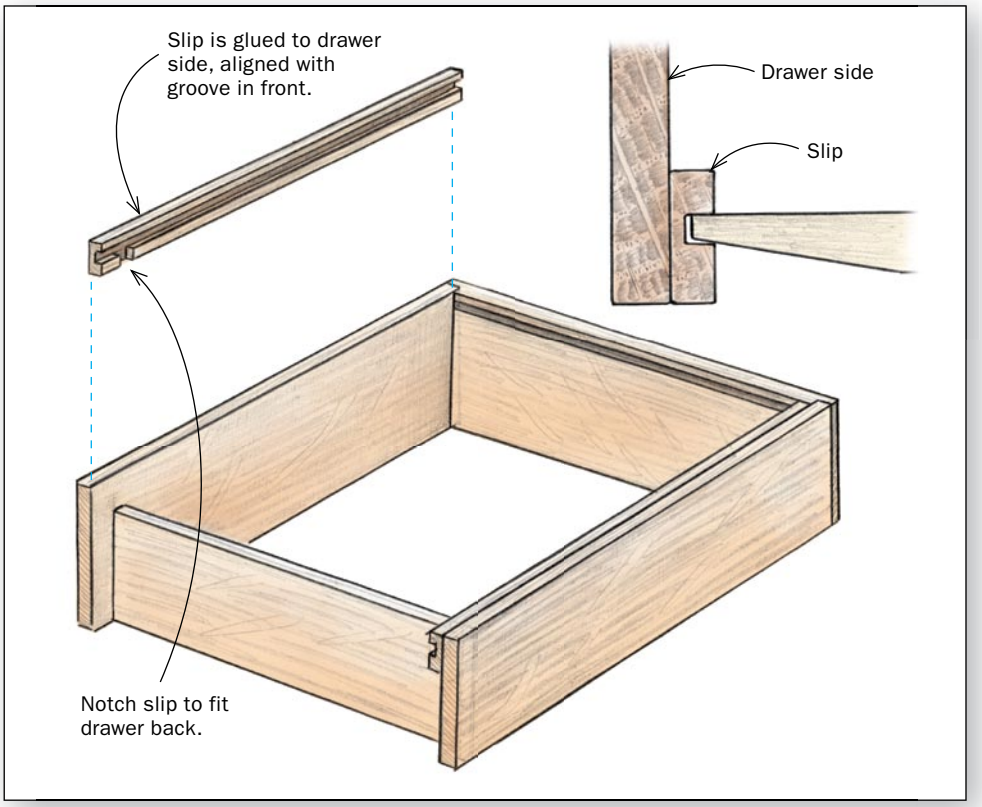
Use slips for thin sides

The English love very fine drawer sides. I do, too. I've made pieces with drawer sides as thin as 3⁄16 in. Generally speaking, these sides are too thin for a groove that can house the bottom. The solution is to glue small grooved slips of wood to the bottom edges of the sides. The slips support the bottom, and the added thickness at the bottom edge of the sides doubles their wearing surface and longevity. I make up the slips separately, and glue them into place once the drawer box is assembled. □

Garrett Hack is a contributing editor.

Use slips for thin sides

When the drawer sides are too thin for a groove of reasonable depth, Hack simply adds a strip of wood, called a slip, to the sides. The extra thickness accommodates the groove and doubles the wear surface on the drawer sides.



Add the slip after assembly. *A small notch toward the rear of the slip accommodates the drawer back, while easing the inside edge produces a clean, finished look. Gluing even the shortest slips will require a surprising number of clamps (right) because the material is thin.*